

## Claims

1        1.     A flow control hub, comprising:  
2                a scoreboard memory device to maintain flow control status for a plurality of flows,  
3                wherein each of the flows is identified by an associated index;  
4                an address decoder to receive a flow control message and to determine the associated  
5                index for the flow control message; and  
6                an updater to update the flow control status in said scoreboard memory device based on  
7                the received flow control message.

1        2.     The apparatus of claim 1, wherein the plurality of flows may be based on at least  
2        some subset of source, destination, protocol, priority, class of service, and quality of service.

1        3.     The apparatus of claim 1, wherein the flow control message is received in  
2        response to capacity of a queue.

1        4.     The apparatus of claim 1, wherein the flow control message is received in  
2        response to changing priorities.

1        5.     The apparatus of claim 1, wherein said updater includes a comparator to compare  
2        the received flow control message with the flow control status maintained in said scoreboard  
3        memory device and said updater updates the flow control status maintained in said scoreboard  
4        memory device based on the comparison.

1           6.     The apparatus of claim 5, wherein said updater updates the flow control status  
2     maintained in said scoreboard memory device to reflect status identified in the received flow  
3     control message if the comparator determines the associated index has either no status, no valid  
4     status or a different status than the received flow control message.

1           7.     The apparatus of claim 5, wherein said updater makes no changes to the flow  
2     control status maintained in said memory device if the comparator determines the associated  
3     index has the same flow control status as the received flow control message.

1           8.     The apparatus of claim 1, wherein said updater discards the received flow control  
2     message.

1           9.     The apparatus of claim 1, further comprising a message generator to generate a  
2     flow control message for a particular flow based on the flow control status maintained in said  
3     scoreboard memory device for the particular flow.

1           10.    The apparatus of claim 9, further comprising a selector to select the particular  
2     flow.

1           11.    The apparatus of claim 1, wherein the flow control message is a broadcast  
2     message.

1           12. The apparatus of claim 11, wherein said updater updates the flow control status  
2 for all flows associated with the broadcast message.

1           13. The apparatus of claim 1, wherein said address decoder utilizes a mapping table to  
2 determine the associated index.

1           14. A flow control hub, comprising:  
2           a scoreboard memory device to maintain flow control status for a plurality of flows,  
3 wherein each of the flows is identified by an associated index;  
4           a message generator to generate a flow control message for a particular flow based on the  
5 flow control status maintained in said scoreboard memory device for the particular flow; and  
6           a selector to select the particular flow.

1           15. The apparatus of claim 14, wherein said message generator transmits the  
2 generated flow control message to a queue associated with the particular flow.

1           16. The apparatus of claim 15, wherein said message generator invalidates the flow  
2 control status maintained in said scoreboard memory device for the particular flow.

1           17. The apparatus of claim 15, wherein said message generator erases the flow  
2 control status maintained in said scoreboard memory device for the particular flow.

1           18. The apparatus of claim 14, further comprising

2           an address decoder to receive a flow control message and to determine an associated  
3        index; and  
4           an updater to update the flow control status in said scoreboard memory device based on  
5        the received flow control message.

1           19.    A method, comprising:  
2            maintaining a flow control status for a plurality of flows in a memory device, wherein  
3        each of the flows is identified by an associated index;  
4            generating a flow control message for a particular flow based on the flow control status  
5        maintained in the memory device for the particular flow; and  
6            selecting the particular flow.

1           20.    The method of claim 19, further comprising transmitting the generated flow  
2        control message to a queue associated with the particular flow.

1           21.    The method of claim 20, further comprising invalidating the flow control status  
2        maintained in the memory device for the particular flow.

1           22.    The method of claim 19, further comprising  
2        receiving a flow control message;  
3        determining an associated index for the flow control message; and  
4        updating the flow control status maintained in said memory device based on the received  
5        flow control message.

1           23.    A method comprising  
2            maintaining a flow control status for a plurality of flows in a memory device, wherein  
3    each of the flows is identified by an associated index;  
4            receiving a flow control message;  
5            determining an associated index for the received flow control message;  
6            updating the flow control status maintained in said memory device based on the received  
7    flow control message.

1           24.    The method of claim 23, wherein said updating includes comparing the received  
2    flow control message with the flow control status maintained in the memory device and updating  
3    the flow control status maintained in the memory device based on results of the comparing.

1           25.    The method of claim 24, wherein said updating includes updating the flow control  
2    status maintained in the memory device to reflect status identified in the received flow control  
3    message if the comparing determines the associated index has either no status, no valid status or  
4    a different status than the received flow control message.

1           26.    The method of claim 24, wherein said updating includes making no changes to the  
2    flow control status maintained in the memory device if the comparing determines the associated  
3    index has the same flow control status as the received flow control message.

1           27. The method of claim 23, further comprising discarding the received flow control  
2           message.

1           28. The method of claim 23, further comprising  
2           generating a flow control message for a particular flow based on the flow control status  
3           maintained in the memory device for the particular flow; and  
4           selecting the particular flow.

1           29. The method of claim 23, wherein said receiving includes receiving a broadcast  
2           flow control message.

1           30. The method of claim 29, wherein said updating includes updating the flow control  
2           status for all flows associated with the broadcast message.

1           31. The method of claim 23, wherein said determining includes utilizing a mapping  
2           table to determine the associated index.

1           32. A store and forward device comprising:  
2           a plurality of Ethernet cards including  
3           a plurality ingress ports to receive data from external sources and transmit the  
4           data based on flow of the data, wherein each ingress port has a plurality of ingress queues  
5           associated with a plurality of flows, and wherein transmission of data from a particular queue is  
6           controlled at least in part by a flow control status associated with the queue; and

7                   a plurality of egress ports to receive data from at least a subset of the plurality of  
8    flows, wherein each egress port has an egress queue for holding the data prior to transmission,  
9    and wherein each egress queue issues flow control messages based at least in part on capacity of  
10   the egress queue;

11                   a backplane to connect the plurality of Ethernet cards together; and  
12                   a flow control hub to receive flow control messages, maintain a flow control status for  
13    each flow based on the received flow control messages, select next flow to receive flow control  
14    message, and generate and forward flow control message to queue associated with the next flow.

1                   33.    The device of claim 32, wherein said flow control hub includes a memory device  
2    to maintain the flow control status for the plurality of flows, wherein each of the flows is  
3    identified by an associated index.

1                   34.    The device of claim 33, wherein said flow control hub further includes  
2                   an address decoder to receive the flow control messages from the egress queues and to  
3    determine an associated index;  
4                   an updater to update the flow control status in the memory device based on the received  
5    flow control message;  
6                   a message generator to generate a flow control message for a particular flow based on the  
7    flow control status maintained in the memory device for the particular flow and to transmit the  
8    generated flow control message to the particular flow; and  
9                   a selector to select the particular flow.